

HAWAII REGIONAL SEDIMENT MANAGEMENT

FY13 WORKSHOP: HALEIWA REGION

JUNE 20, 2013



U.S. ARMY CORPS OF ENGINEERS
HONOLULU DISTRICT

HAWAII DEPARTMENT OF LAND AND NATURAL RESOURCES
OFFICE OF CONSERVATION AND COASTAL LANDS

HAWAII RSM WORKSHOP

- **Haleiwa Region: Background**
- **Coastal Processes**
- **Potential RSM Projects**
- **Environmental**
- **Questions**



HAWAII REGIONAL SEDIMENT MANAGEMENT
HALEIWA REGION

PUAENA POINT BEACH

HALEIWA BEACH

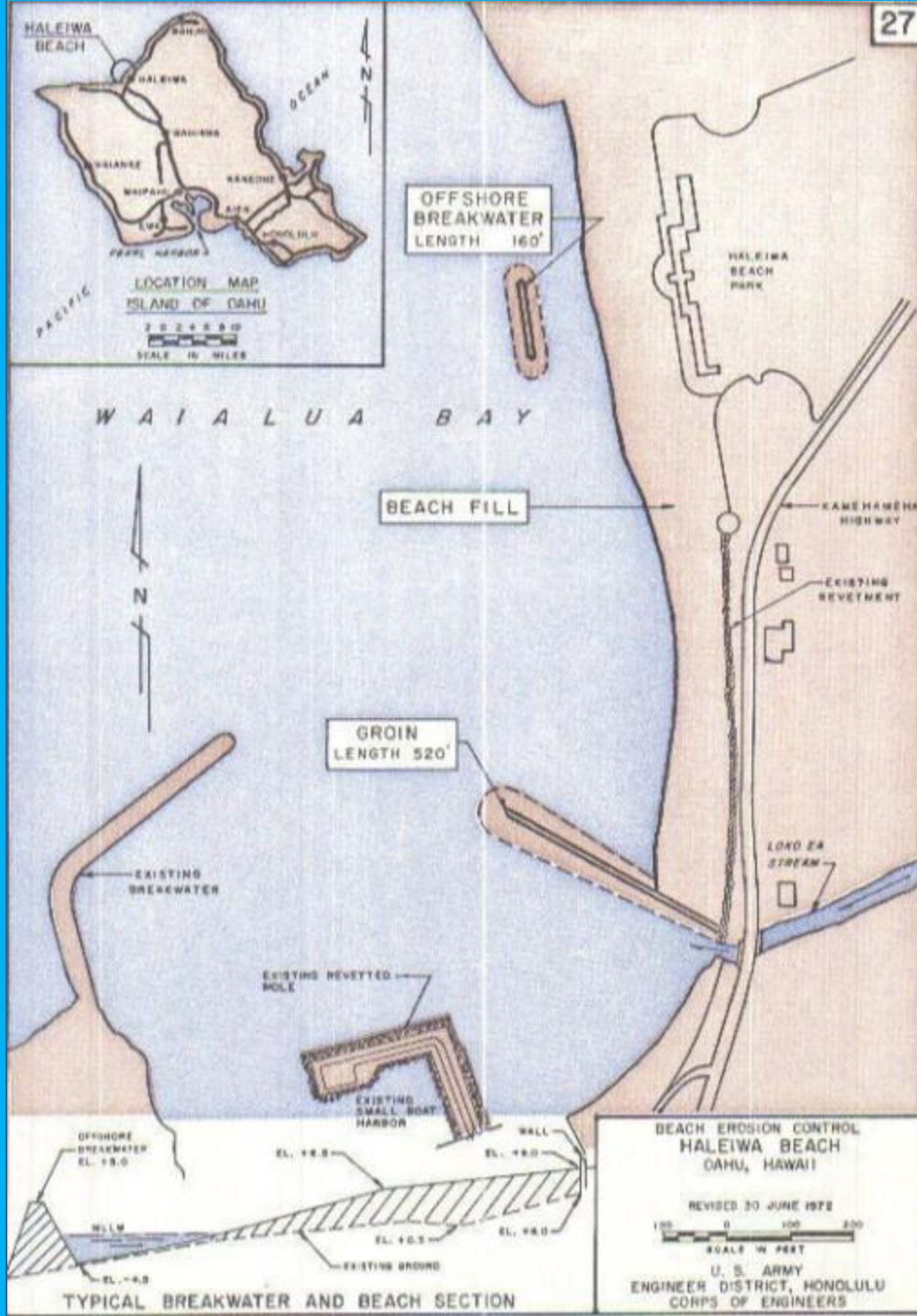
HALEIWA SMALL BOAT HARBOR

ALII BEACH

KAIKA BEACH



HALEIWA BEACH PARK SPP



HALEIWA BEACH PARK SPP

HISTORIC AERIAL PHOTOGRAPHS: Courtesy SOEST (UH)



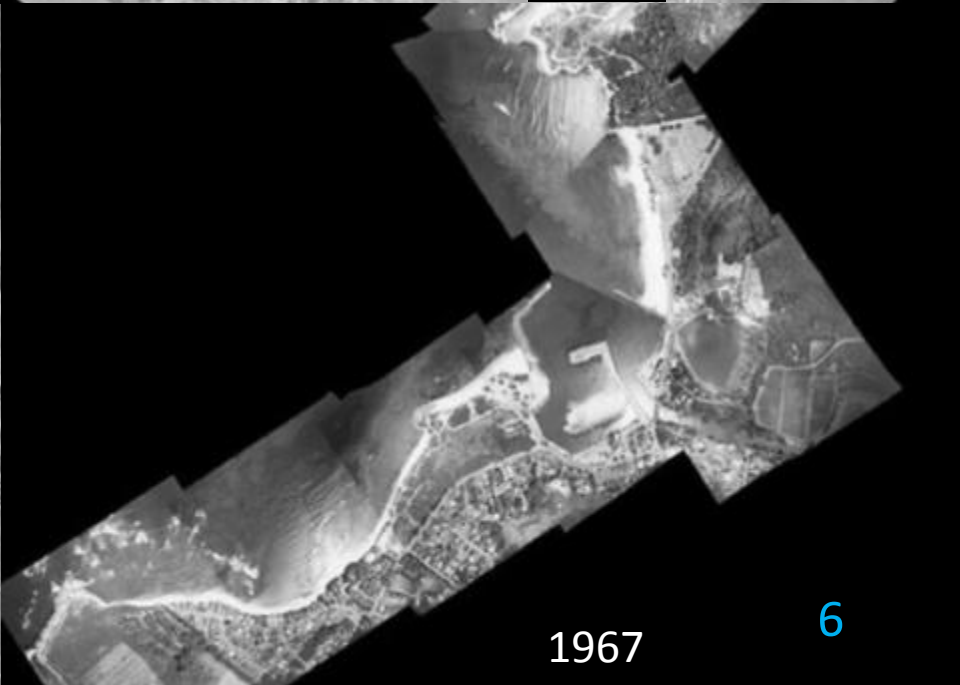
1928



1949



1950



1967

HISTORIC AERIAL PHOTOGRAPHS: Courtesy SOEST (UH)



1971



1975

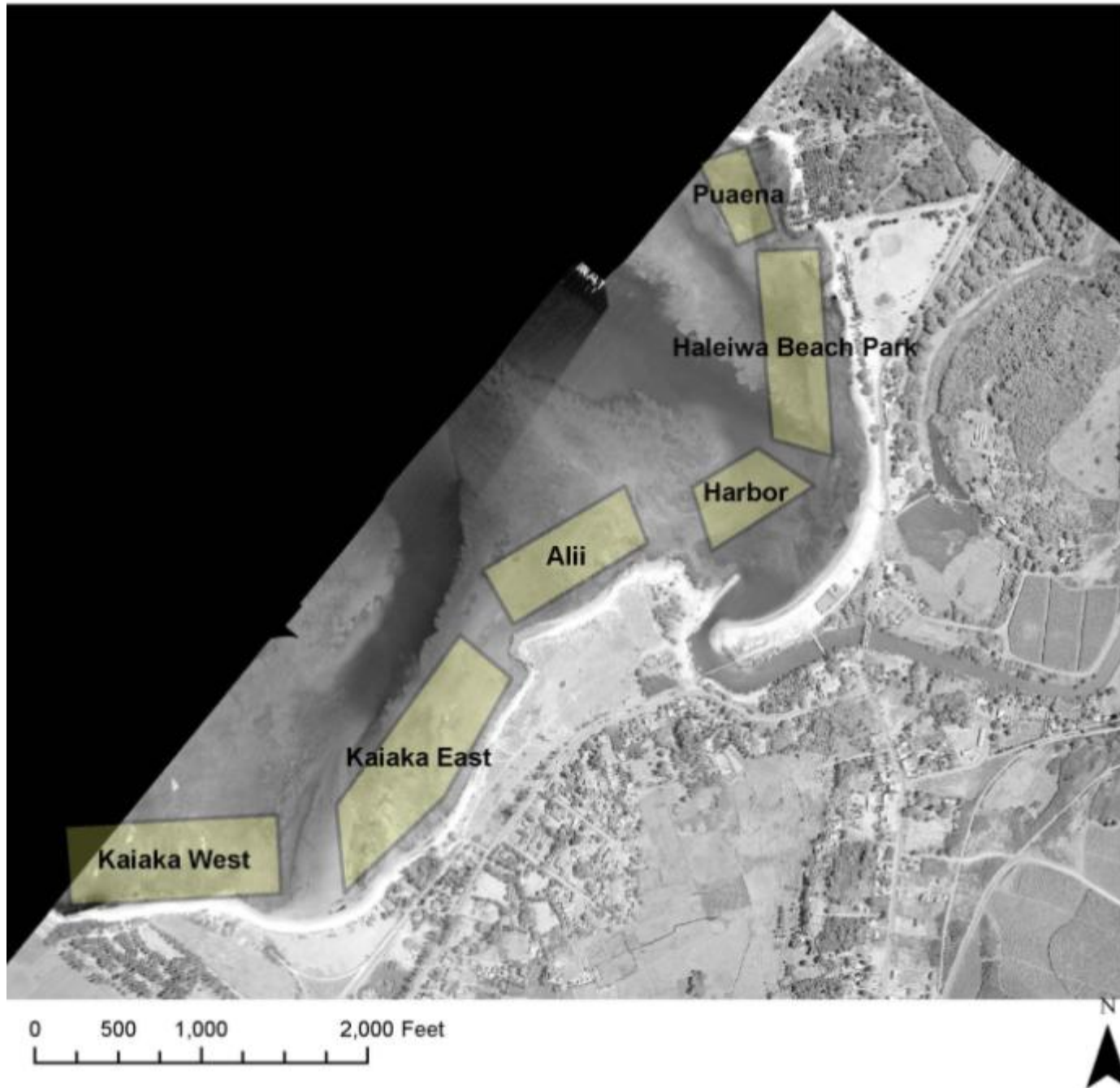


1988

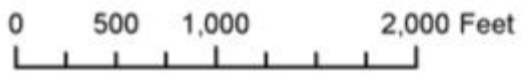


2006

1949 Aerial Photograph (Prior to Harbor Construction)



2006 Aerial Photograph (After Harbor Construction)



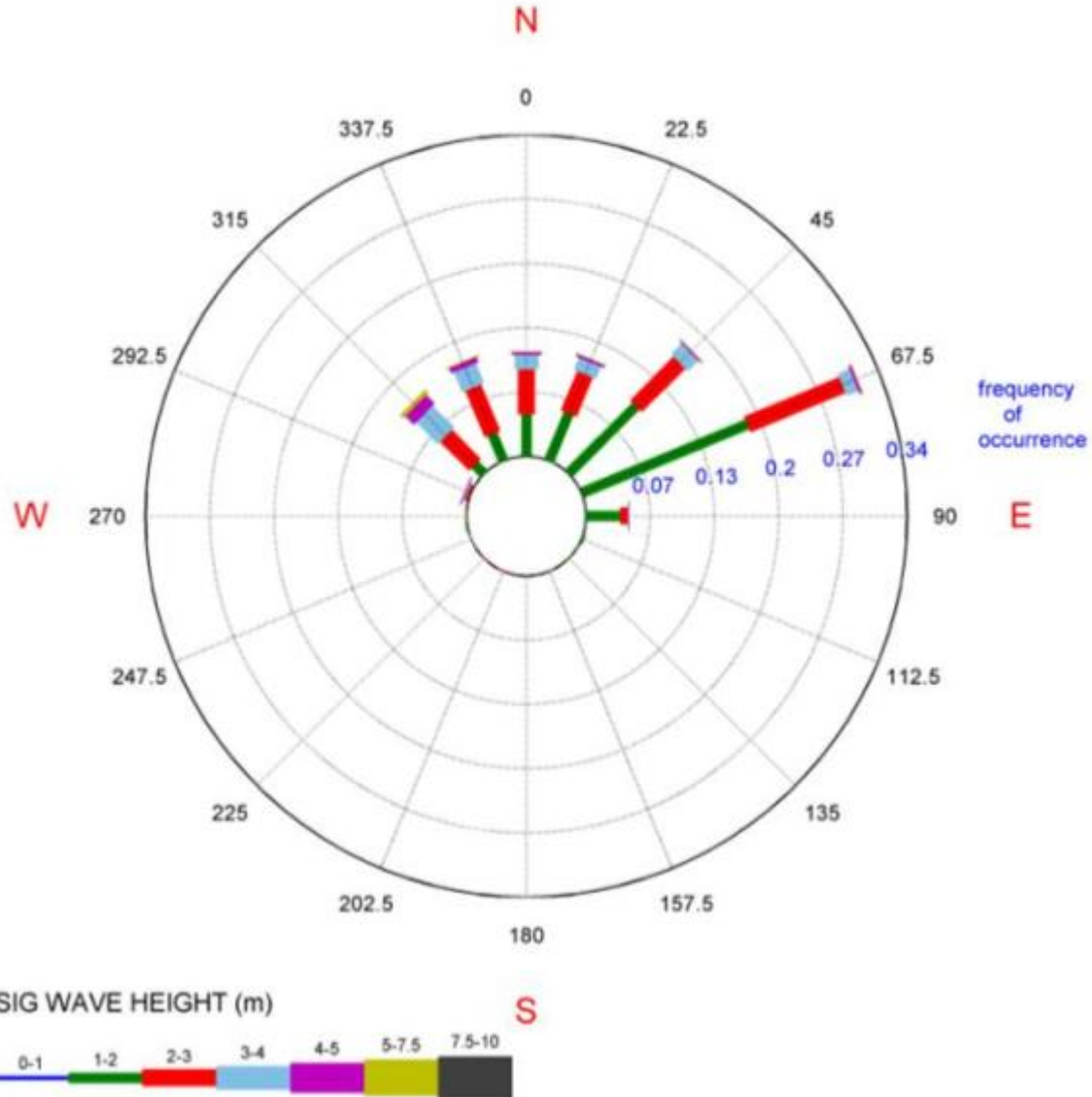
W.I.S. HINDCAST STATIONS

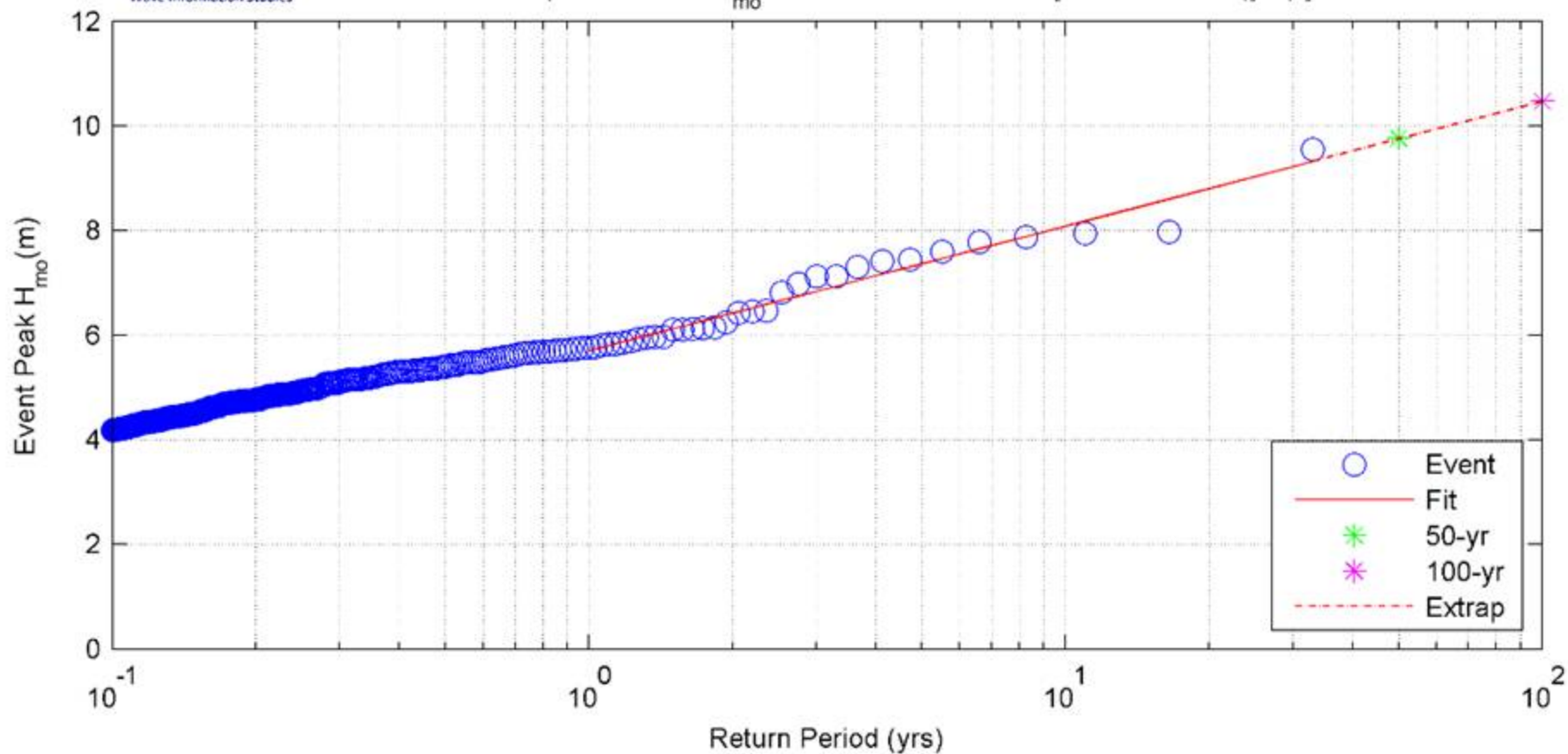


Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Data LDEO-Columbia, NSF, NOAA
Image © 2013 TerraMetrics
Data MBARI

Google earth

WAVE ROSE





Top 10 events based on Peak H_{mo}									
Event	Date/Time(UTC)	H_{mo}	T_p	θ_{mean}	Event	Date/Time(UTC)	H_{mo}	T_p	θ_{mean}
1	1992/09/12 03:00	9.55	14.45	181.0	6	1986/02/23 10:00	7.60	19.45	307.0
2	1998/01/28 15:00	7.98	21.15	321.0	7	1987/01/10 04:00	7.45	18.94	317.0
3	1983/02/10 21:00	7.94	18.09	321.0	8	1980/02/17 06:00	7.41	17.54	319.0
4	1985/01/15 03:00	7.88	16.78	312.0	9	2003/01/05 12:00	7.30	17.72	315.0
5	1981/01/20 09:00	7.78	18.16	323.0	10	1982/11/24 07:00	7.13	12.96	237.0

An event is defined as any period when $H_{mo} > 4.00\text{m}$

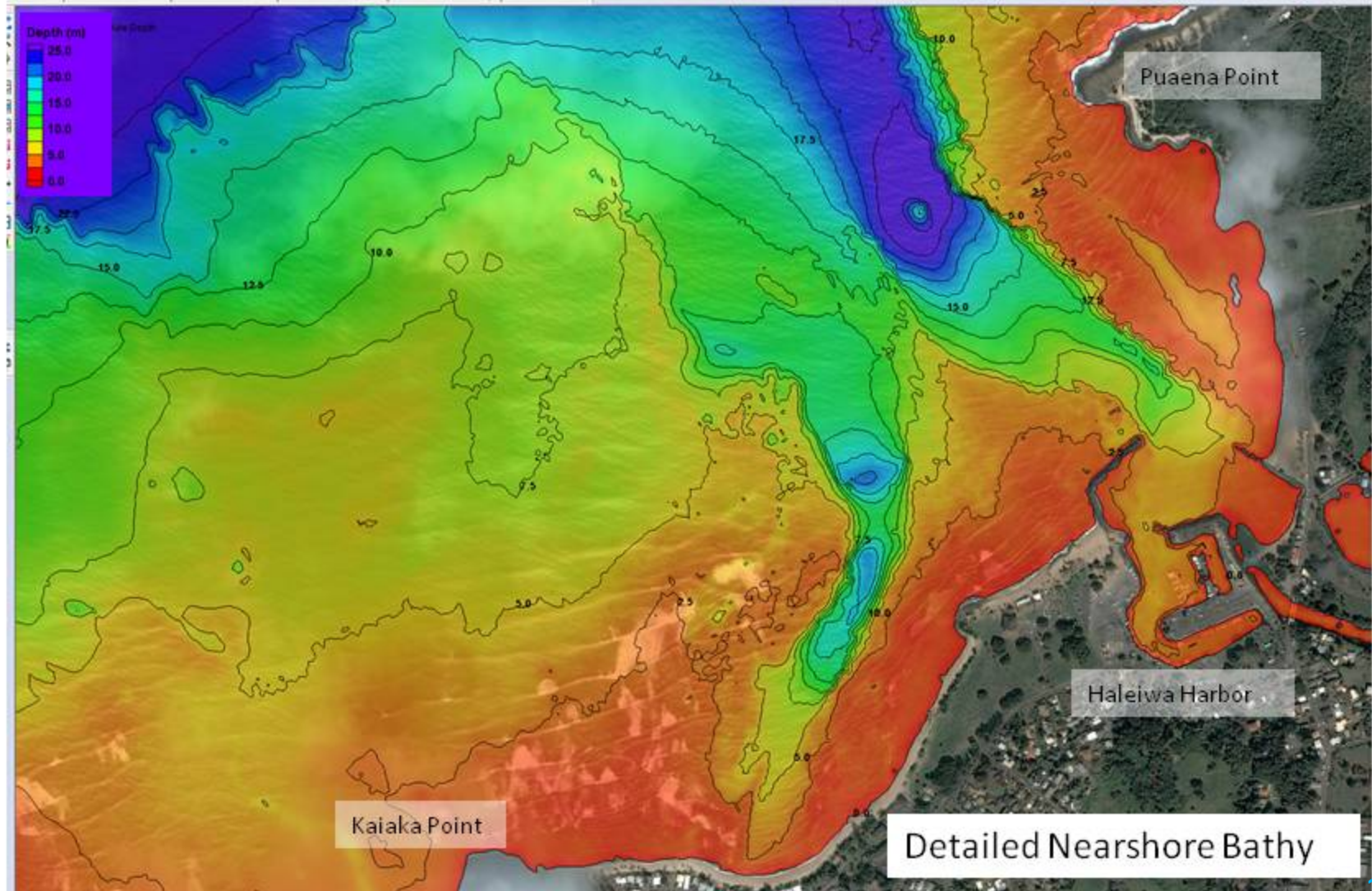
θ_{mean} is direction that waves are arriving from

HALEIWA REGION OFFSHORE DEPTH CONTOURS



CMS-Wave

- Wave forcing from offshore WIS Station
- Wind forcing from offshore WIS Station
- Manning's n friction coefficient of 0.20 over reefs



HALEIWA REGION WAVES AND CIRCULATION



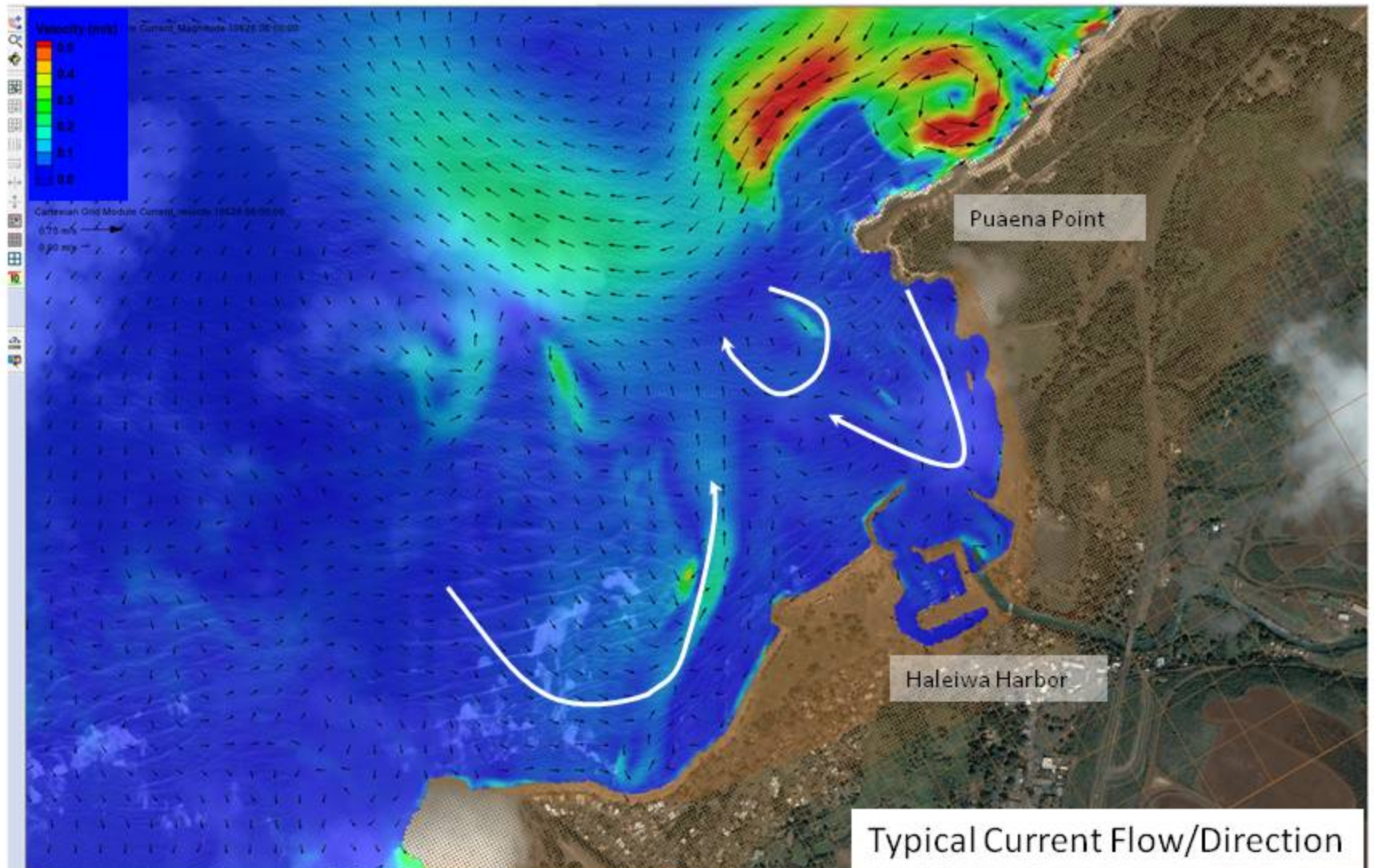
CMS-FLOW

- Water level forcing from NOAA Haleiwa tide sub-station
- Wind forcing from offshore WIS Station
- Manning's n friction coefficient of 0.20 over reefs



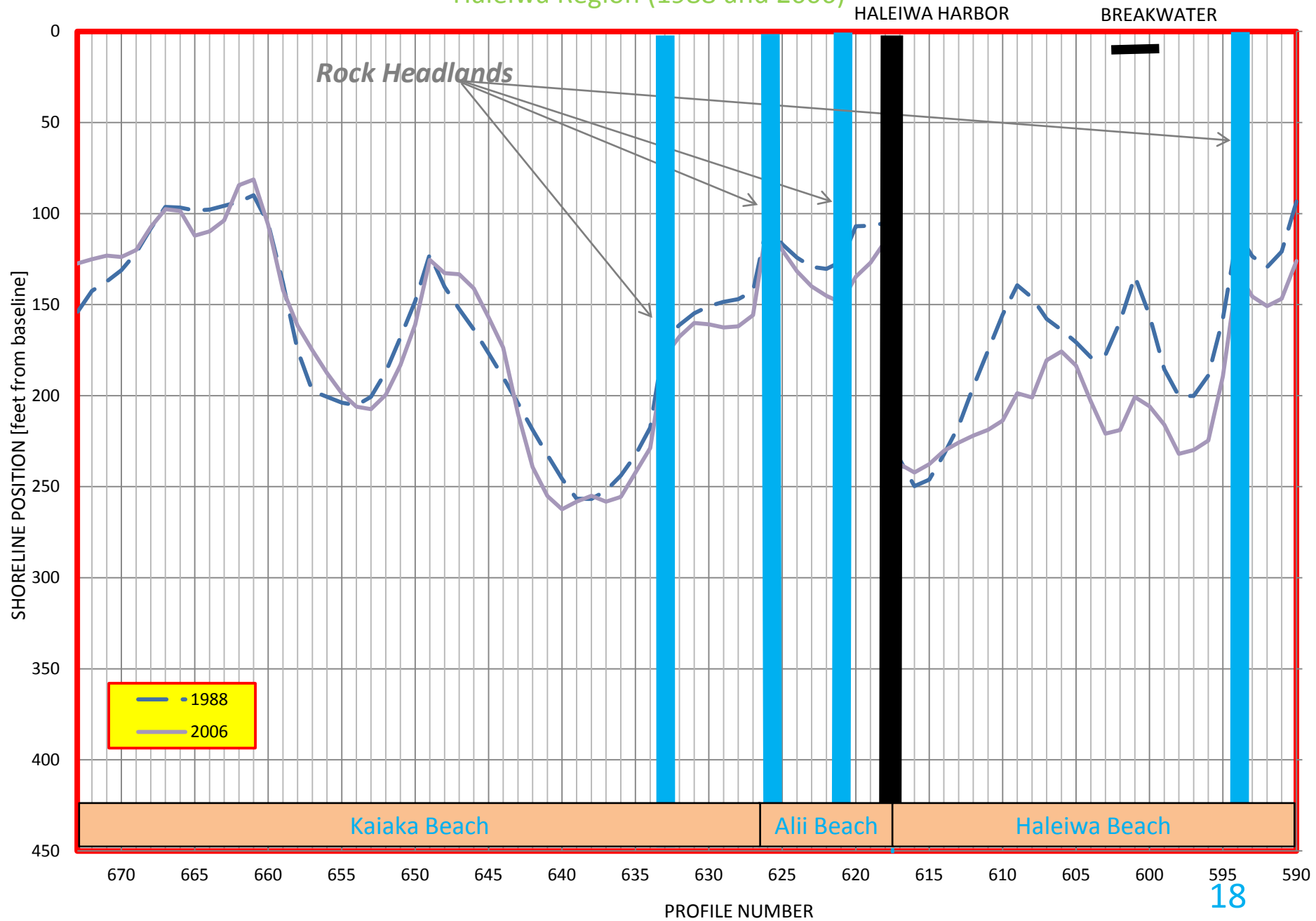
CMS Steering Runs

- Radiation stress from CMS-WAVE wave breaking => longshore current in CMS-FLOW
- Varying water level and tide induced currents in CMS-FLOW => water depth and current/wave interaction in CMS-WAVE

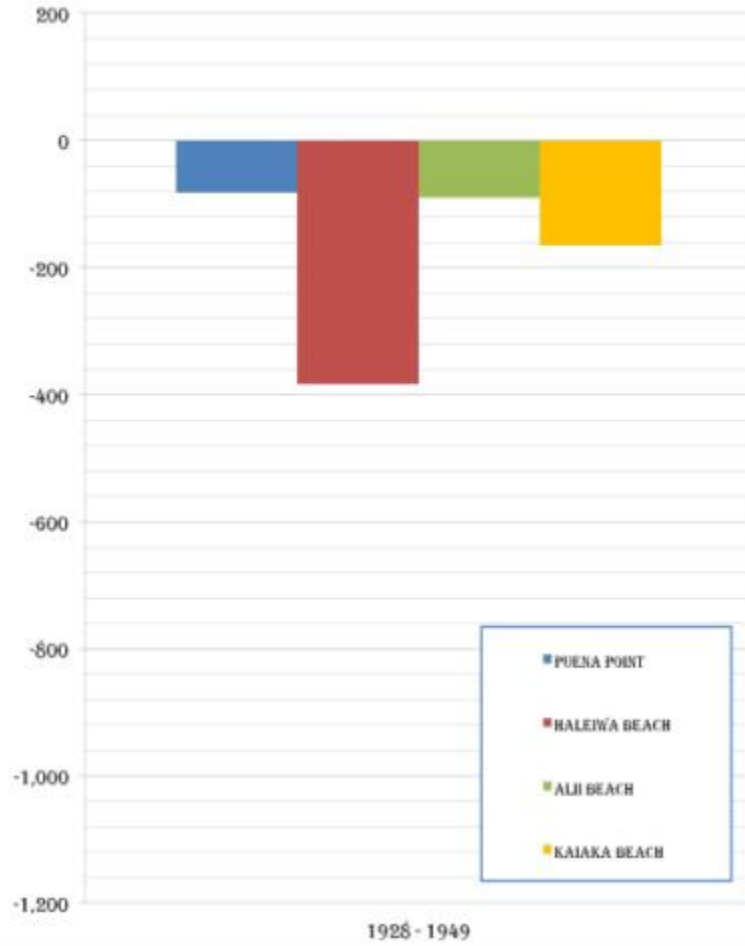


HAWAII REGIONAL SEDIMENT MANAGEMENT - SHORELINE POSITIONS

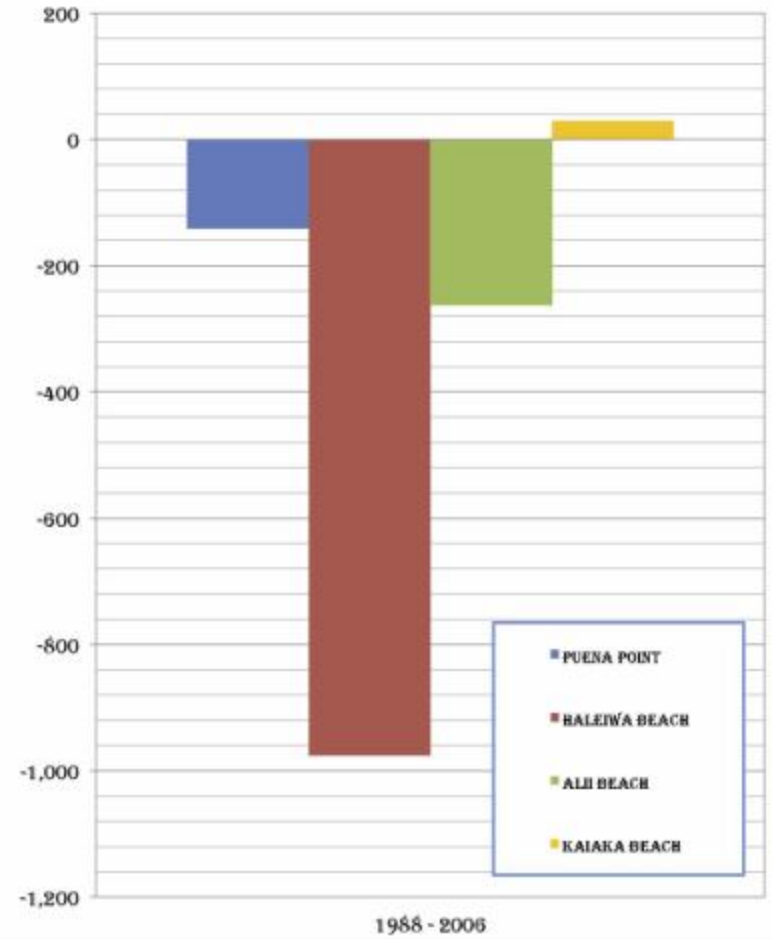
Haleiwa Region (1988 and 2006)



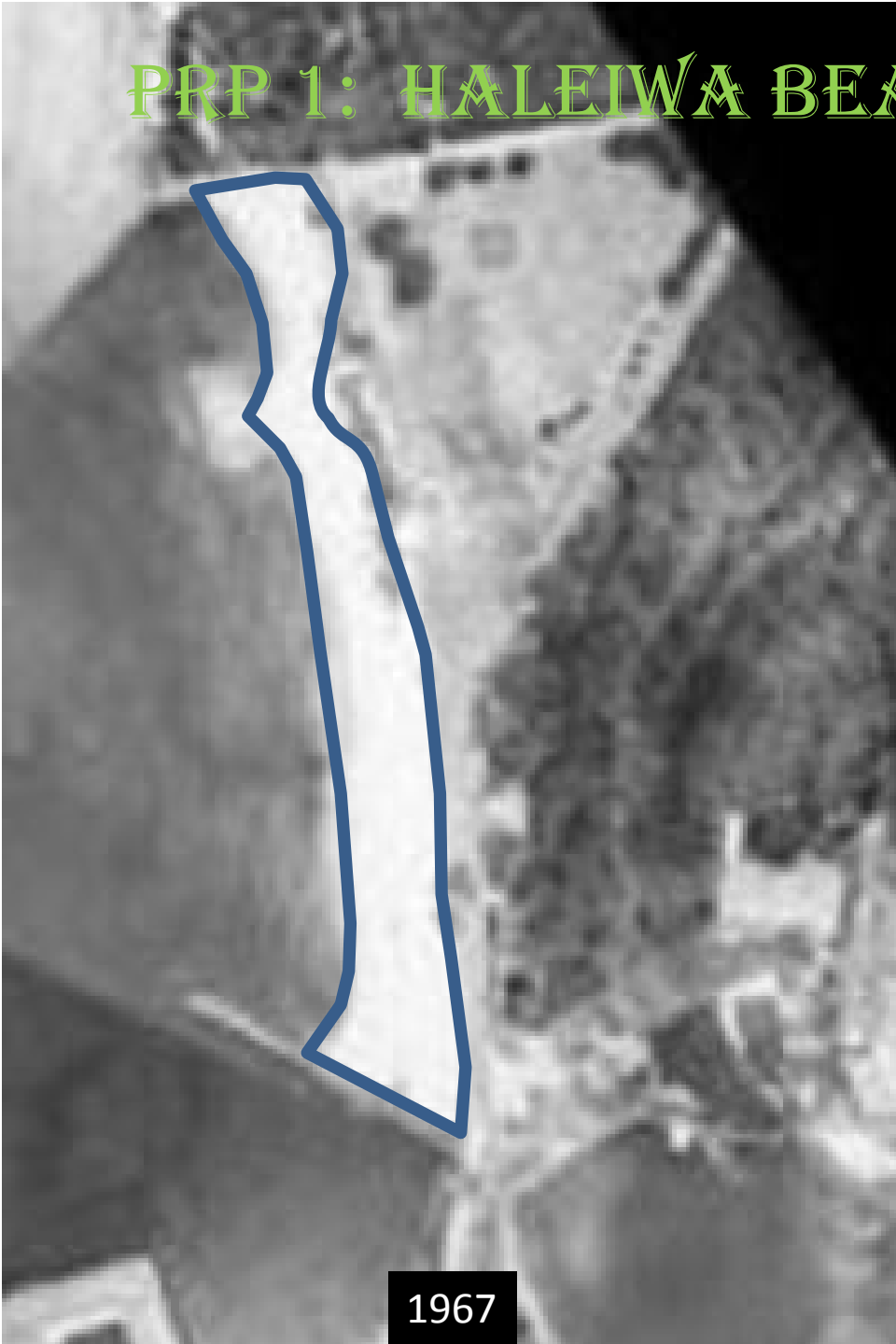
HAWAII REGIONAL SEDIMENT MANAGEMENT: HALEIWA REGION
VOLUME CHANGE RATES [CY/YR] 1928 - 1949



HAWAII REGIONAL SEDIMENT MANAGEMENT: HALEIWA REGION
VOLUME CHANGE RATES [CY/YR] 1988 - 2006



PRP 1: HALEIWA BEACH RENOURISHMENT



1967



2013

PRP 2: HALEIWA BEACH T-HEAD GROINS



PRP 2: HALEIWA BEACH T-HEAD GROINS



PRP 3: HALEIWA BEACH GROIN POROSITY



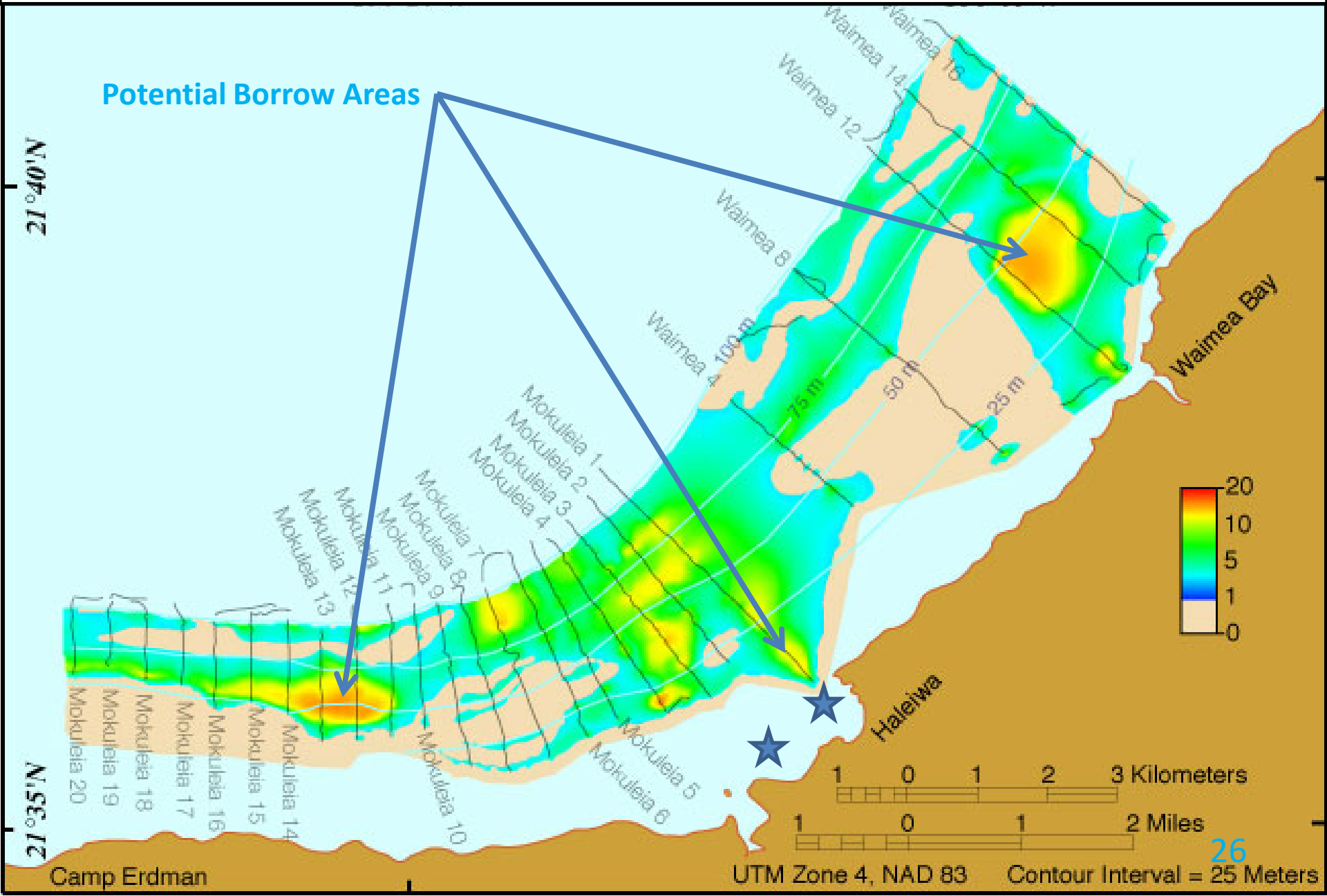
PRP 3: HALEIWA BEACH GROIN POROSITY



PRP 4: HALEIWA SBH MAIN BREAKWATER



PRP 5: SAND SOURCES USGS SEDIMENT THICKNESS MAP



PRP 5 (CONTINUED): SAND SOURCES HALEIWA SMALL BOAT HARBOR DREDGED MATERIAL



Design and Construction Supervised by:



Harbor Navigation Improvements

Haleiwa and Waianae Small Boat Harbors
Maintenance Dredging

Sponsored by USACE

Contractor:
Trade West Const. Inc.
Port Allen, Hawaii



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THANK YOU

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